

Review of U. S. Standard Atmosphere, 1962,  
sponsored by the National Aeronautics and Space Administration,  
United States Air Force,  
and United States Weather Bureau,  
U. S. Government Printing Office, Washington 25, D. C.

R. R. Rapp

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R. R. Rapp\*  
The RAND Corporation, Santa Monica, California

Amazement at the precision and detail of the tabulations was my first reaction to the U. S. Standard Atmosphere. My second was to wonder why such tabulations were needed. The volume gives little clue as to why it was published in its present form. It appears much more detailed and extensive than would be necessary for aircraft operation. The atmosphere is much too variable to permit the tables to be used in any operational problems, and researchers in meteorology and aeronomy who need approximate values may find its detail maddening.

The model from which this standard has been computed was carefully devised and well presented. The section on basic assumptions and formulas is very well presented and upon a careful reading, the need to be precise about the approximations is apparent. The only addition which might be made would be to point out explicitly that geometric height, as used here, is defined with respect to a definite, albeit arbitrary, ellipsoid of revolution.

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The section on derived quantities gives brief, clear definitions of the auxiliary quantities that are tabulated. These definitions are well stated and easy to find, and it is to be hoped that users of the tables will consult the definitions to be sure that they do not misinterpret the tabulated values.

At the very end of Part I there is a table of defining properties. It is unfortunate that the choice of these values is not discussed at greater length. It is in the process of specifying the temperatures, the lapse rates, and the molecular weights that subjective judgment is used to convert the mathematical model of a set of possible Earth's atmospheres into a standard atmosphere.

In Part II.1, entitled "Validity," the statement is made that the "temperature profile (and molecular-weight profile) are based upon experimentally determined values, modified slightly to achieve easily computable gradients." I suspect that the choice of experimentally determined values and the method of modification required a large part of the time of the committee. I think that a discussion of the basis of the choices would have been appropriate.

The additional information relating to the atmosphere, which is presented in Part II, does not approach the standards of precision and clarity that are found in Part I. The reason for this is perhaps the speculative nature of the data under discussion. The data above 50 km, were taken at random times, at a few spots on the globe, and with a variety of instruments. These are presented, along with deductions from satellite-drag measurements, estimates from other models, and several other standard atmospheres. The merits and deficiencies of all these observations, deductions, and hypotheses cannot be adequately presented in 8 pages of discussion. The section on additional information emphasizes the lack of detailed information about a very variable atmosphere but gives very little useful additional information.

The tables in Part III comprise the body of the work. They may be considered in three groups; the three tables in the first group list all relevant values in metric units, both in geopotential and geometric height; the three in the next group repeat the first

three in English units; and the four in the last group are conversion tables for geopotential altitude in various units to pressure in various units. The arrangement of the tables is somewhat confusing as the tabulation interval is changed with height, and further, the first 90 km are presented in even increments of both the geopotential altitude and geometric altitude. It is possible to extract much information from the tables in many different forms, but it may require a great deal of page turning to do it.

The U. S. Standard Atmosphere, 1962 is a prodigious work. The tables represent a meticulous calculation of a set of consistent values of many properties of the atmosphere plus the acceleration of gravity. The model for the calculation was well designed and should be an excellent reference in the study of planetary atmospheres.